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(54) **APPARATUS AND METHOD FOR WET FILTERING MACHINE EXHAUST**

VORRICHTUNG UND VERFAHREN FÜR DIE NASSFILTRATION VON MASCHINENABGASEN

DISPOSITIF ET PROCEDE DE FILTRAGE HUMIDE D'UN ECHAPPEMENT DE MACHINE

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Description

[0001] During the process of printing, laser printers and copy machines produce a gas called ozone. Health problems associated with ozone gas pollution include headaches, eye irritation, nose irritation, throat irritation and dryness to the eyes, nose and throat. In addition to ozone gas, toner dust and particulate matter can present further health risks to office machine users.

[0002] Most existing office machines are equipped with filters to alleviate the adverse affects of air pollution. However, a printer's or copy machine's temperature may rise by over 10% due to filter clogging. The clogged filter also makes the fan slow down due to reduced air flow, which in turn can produce increased printed page defects and also increase the danger of major components failing.

[0003] Although periodic filter replacement can cut down on the health risks and adverse financial impact associated with office machine air pollution, many filters are not easily accessible to non-technicians. Further, because saturated and clogged filters cause machine breakdown, many persons simply remove a machine filter rather than properly replacing it. As a result, many office machines have no filters, increasing air pollution and the risks associated with the pollution.

[0004] The document DE 328 826 C discloses an apparatus for wet filtering of machine exhaust and a method therefore. A housing provided with a channel for machine exhaust is provided with filter sticks which are arranged in vertical manner. The filter sticks are rods or perforated tubes coated with wood-chip or textile fibre and they are affixed at a bottom portion of the channel with their upper end portion whereby a lower end portion of the filter sticks is arranged in a bath which can contain water, glycerine or the like. The material of the filter sticks adsorbs the fluid of the bath and transports it into the channel portion through which machine exhaust is flowing through. Pollutions adhere to the filter sticks. The fluid evaporates from the filter sticks in the filter channel.

[0005] The US 1,989,773 describes a de-dusting apparatus for removing dust from a gas flowing through said filter. A housing is provided with a channel for a gas stream flowing through the filter housing. In said channel are arranged filter sticks which are affixed in vertical manner between a upper and a lower wall of said channel. The lower wall is provided with openings for removing a filter fluid that is flowing downwards at certain portions of the filter sticks. In the upper portion of the filter sticks, they are supplied with a cleaning fluid from a container being arranged above the channel and having a plurality of openings supplying the fluid to certain portions of the filter sticks that are directed opposite to the gas stream. Moreover, pressure cleaning is provided by a valve controlled supply pipe which is provided for every filter stick.

[0006] An associated effect of office machine air pollution is the adverse smell of the machine exhaust. In conjunction with the expulsion of ozone gas and particulates, the exposure to such smells can have deleterious health effects on users.

[0007] Consequently, there is a need for a filter device for office machines that is easily replaceable by the machine users. Further, there is a need to eliminate adverse smells associated with office machine exhaust.

[0008] Accordingly, the present invention answers these needs by providing a wet filter apparatus and method for filtering office machine exhaust, and providing a more desirable scent to users.

SUMMARY OF THE INVENTION

[0009] The present invention provides an apparatus and method for filtering office machine exhaust to reduce health-risks to users and internal damage to machines.

[0010] The present invention further provides an apparatus and method for filtering office machine exhuast that can be used by machine users that are non-technicians.

[0011] An aspect of the present invention is a wet filtering apparatus and method for limiting the expulsion of ozone and toner and particulate pollutants from office machines into the ambient air.

[0012] A further aspect of the present invention is the conducting of ethereal oils along a foam filter stick to remove air pollutants from office machine exhaust.

[0013] A further aspect of the present invention is to provide desirable scented oils to control adverse smells from office machine exhaust.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

FIG. 1 is a perspective view of the filter of the present invention illustrating the filter housing without filter sticks;

FIG. 2 is a partial top perspective view of the filter sticks filtering section of the filter apparatus of the present invention;

FIG. 3 is a side partial elevational view of the filter sticks filtering section of the filter apparatus of the present invention;

FIG. 4 is a side partial elevational cut-away view of the filter apparatus of the present invention showing a security ring and a filter stick's relationship therewith;

FIG. 5 is a top perspective view of a security ring of the filter apparatus of the present invention;

FIG. 6 is a perspective view of a filter stick of the filter apparatus of the present invention;

FIG. 7 is top cross-sectional view of the filter sticks filtering section and the associated filtration of polluted air in the filter apparatus of the present invention; and

FIG. 8 is a cross-sectional side view of an oil container containing oil in the filter apparatus of the

present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0015] The present invention relates to an apparatus and method for wet filtering machine exhaust. In the preferred embodiment of the present invention, an apparatus and method for filtering the exhaust of office machines, such as copiers, printers, and facsimile machines, with oil conducted along a filter medium is disclosed. Although the present invention is described with regard to filtration of office machine exhaust, those of ordinary skill in the art will appreciate that the present invention is adaptable to variety of machines in which gas and particulate pollutants are desirably filtered from entering the ambient air.

[0016] In the preferred embodiment, a filter apparatus of the present invention includes three main parts: (i) a housing with filter sticks; (ii) two oil containers, one for delivering oil along the filter sticks and the other for receiving the delivered oil; and (iii) a wide range of ethereal oils provided with desired scents.

[0017] Referring to FIG. 1, a filter housing **(3)** of the filter apparatus of the present invention is disclosed. Preferably the housing is of rectangular shape with two side walls **(62),** a top wall **(64),** and a bottom wall **(65).** The housing preferably comprises heat-resistant plastic, which is able to withstand a temperature of at least 60° Celsius. Although the external appearance of the housing is preferably rectangular, the housing may be square, rectangular, round, or custom-shaped based on the exhaust opening of a machine which the filter apparatus covers.

[0018] Adjacent to each of the upper top and bottom walls are preferably two oil container holding areas **(110).** Each of the holding areas preferably includes a back wall **(27).** A catch opening **(25)** is preferably provided along each of the back walls **(27)** for receiving a catch from the oil container. A locking projection **(20)** is further preferably provided along the bottom face of each of the holding areas for locking the respective oil containers in place. At the base of the upper holding area a holding area base plate **(69)** is provided with a plurality of housing filter stick openings **(30).** Similarly, the bottom holding area is enclosed by a base plate **(67)** with a plurality of housing filter stick openings **(30).**

[0019] Each filter stick opening **(30)** of base plate **(69)** has a corresponding filter stick opening in parallel base plate **(67).** The filter stick's filtering section **(4),** the area between parallel base plates **(67)** and **(69),** preferably comprises a plurality of filter sticks **(50)** for conducting oil from the openings **(30)** in base plate **(69)** to the corresponding openings **(30)** in base plate **(67).**

[0020] In each of the side walls **(62)** an air outflow opening **(60)** is provided. In order to preclude the fundamental overheating of a machine, an oblong exhaust slit is preferably located on the left and right side of the housing. The exhaust slits preferably prevent excess pressure in the filter itself, since, as a result of them, the backed up or excessively produced air quantities have the possibility of being able to exit on both sides.

[0021] Preferably, one or more brackets **(40)** attach a side wall **(62)** to an office machine. The filter apparatus is preferably secured with filtering section **(4)** placed in front of the exhaust of the office machine. As a result of the different sizes of various ventilators, the exhaust openings of machines are of different sizes as well. In other words, the housing of a filter must be adjusted to the size of the exhaust openings, in order to receive the original air quantity flow of the machine. Otherwise, an overheating of the internal chamber of the machine could result.

[0022] The attachment bracket **(40)** may be a single bracket or a plurality of brackets on any one or more of the walls of the housing, depending on the machine to which the filter apparatus is attached. Housing attachments, in any form, are primarily based on the respective type of machine to which the housing is to be applied. As a result, the attachment bracket contemplates a variety of attachment means, including plastic brackets and click systems.

[0023] Preferably, in right side wall **(62)** an upper and lower oil container opening **(70)** is provided for insertion and removal of the oil containers.

[0024] Referring to FIG. 8, an oil container **(10)** filled with oil **(5)** is disclosed. The oil container preferably includes a bottom face, a left and right face, and a front and back face. The top of the container is preferably open for filling the container with oil out of the filter housing. When placed in the filter housing, a container is either closed by top wall **(64)** or base plate **(67),** depending on whether the container is an upper or lower container. In an alternative embodiment an oil filling device may be integrated with the housing and an upper oil container without removing the container from the housing.

[0025] The bottom face of the oil container preferably includes a plurality of oil flow openings **(16).** An oil pad **(15)** preferably covers the openings to slow and control the flow of oil **(5)** to the openings **(16).** In the preferred embodiment, the bottom third is filled by the pad **(15),** which is preferably a rubber foam pad.

[0026] On the back face of the oil container, a catch **(12)** is preferably attached. The front face of the oil container preferably includes a grip rail **(11)** for sliding the oil container in and out of the filter housing. A viewing glass **(13)** is also preferably provided on the front face of the oil container for a user to examine the remaining oil level.

[0027] The bottom of the oil container preferably includes one or more locking clips to secure the oil container at the locking clip projection **(20)** of the housing.

[0028] Preferably, the locking clips also receive a rubber closure for closing the flow openings **(16).** The rubber closure preferably slides between the locking clips **(14)** and can be inserted or removed as needed to prevent or allow the flow of oil from the openings.

[0029] Referring to FIGS. 1, 2, and 8 an oil container **(10)** filled with oil and without closure **(18)** is inserted through upper opening **(70)** into the upper container holding area **(110)** of the filter housing **(3).** The oil container catch **(12)** connects into catch opening **(25).** Locking clips **(14)** preferably connect to one or more locking projections **(20)** by a click locking system to prevent the containers from falling out. The plurality of flow openings **(16)** are adjacent to filter stick openings **(30).**

[0030] The second oil container **(10)** initially does not contain oil and includes rubber closure **(18)** to close the plurality of flow openings **(16).** The second oil container is inserted into lower holding area **(110)** of the housing. The open top of the lower oil container is preferably adjacent to the plurality of filter stick openings in base plate **(67)** of the housing.

[0031] Preferably oil **(5)** in the upper oil container slowly flows through the pad **(15)** to and through the oil flow openings **(16)** and into the filter stick openings **(30).** Gravity causes the oil to flow (90) downward along the plurality of filter sticks **(50).** The oil continues to flow downward to the filter stick openings **(30)** in base plate **(67).** The oil subsequently drips off into the lower oil container.

[0032] Referring to FIG. 7 exhaust **(120)** from an office machine blows through the filtering section of the filter apparatus. Ozone particulates, and other pollutants contact the oil along filter sticks **(50)** and are removed from the exhaust. Filtered air **(125)** flows out of the filtering section **(4)** and into the ambient air from the filter apparatus.

[0033] Referring to FIG. 6, the filters sticks **(50)** are preferably round, perpendicularly standing foam rubber rods of approx. 5-6 mm in diameter and a perforated plastic surface which are perpendicular and staggered to one another. In alternative embodiments the filter sticks may be of various shapes including oval, square, rectangular, triangular, and other shapes.

[0034] The filter sticks, or foam rubber rods, are preferably a fixed component and are attached to the housing at the corresponding filter stick openings in base plates **(67)** and **(69).** The filter sticks are also preferably perpendicular in order to enable the automatic flow of oil by gravity. The filter sticks are further preferably staggered, in order to force the outflowing air quantities to flow around the foam rubber rods. The distance from one foam rubber rod to another preferably is no greater than 2 mm.

[0035] Referring to FIGS. 4 and 5 a security ring **(130)** is provided in the preferred embodiment to maintain the distance between the filter sticks. The filter sticks are preferably maintained perpendicular to base plates **(67)** and **(69),** and parallel to one another.

[0036] The foam rubber material of the filter sticks preferably prevents a rapid flow of oil from the full upper oil container into the lower empty oil container. In addition, the individual foam rubber rod is preferably mechanically strengthened internally by the perforated plastic surface (simultaneously a mechanical protection against external damage, such as during cleaning). The perforation permanently allows low moisture on the external surface of the rods. As a result of this surface moisture, microscopically small particles which are located in the exhaust flowing out of a machine by means of ventilators are preferably captured and deposited on the external cover of the foam rubber rods (the finest toner particles, oil residues, silicones, oils of all types, as well as dust and environmental air pollution).

[0037] Referring to FIG. 2, around these filter sticks there are light channels **(101)** and **(102)** along the respective length of base plates **(67)** and **(69).** The channels prevent possible outflow of the ethereal oil during a change of the oil containers.

[0038] In a preferred embodiment, the oil **(5)** is ethereal oil, which may have a desired scent. As the pollutants are removed by the oil flowing along the filter sticks, the desired scent from the ethereal oil is provided into the air by the warm air from the exhaust of an office machine. Accordingly, both filtration and a desirable scent are achieved by the filter apparatus.

[0039] In the preferred embodiment of a method of the present invention, an oil container is filled with ethereal oil of a desirable scent and placed in the upper oil container holding area. A second, empty oil container is placed into the lower container holding area. Each of these oil containers preferably comprises heat-resistant and acid-resistant and mechanically solid plastic.

[0040] The internal construction of each container, full or empty, is preferably the same. In order to prevent the oil which is contained in the container from being able to flow out too quickly, the lower part of the interior side of the container is designed with a foam rubber pad (along the entire length and over all openings into which the foam rubber rods lock). This foam rubber pad preferably fills approximately the lower third of the entire container and will draw the ethereal oil, but only slowly allow it to pass through to the foam rubber rods.

[0041] In the preferred embodiment, once the upper oil container is essentially empty, and the lower container has received the flowing oil, the containers may be switched. Preferably the closure on the lower container is removed, opening the oil flow openings, and the lower container is inserted into the upper container holding area. The closure is inserted at the base of the empty upper container, thereby closing the oil openings, and the empty container is inserted into the lower holding area. Preferably, this process may be repeated for up to three months, depending on the rate of loss of the ethereal oil mixture.

[0042] In a further embodiment, the filter sticks are preferably washable. The filter apparatus may be removed from the machine and washed with a cleansing agent, such as water, to remove the pollutants which build-up on the filter sticks.

[0043] In an alternative embodiment, the filter housing may be discarded, and a filter apparatus with fresh filter sticks may be attached at desired filter-changing intervals for the office machine.

[0044] Ethereal oils have very good properties for controlled flow and filtering. Preferably lime-free normal water may be added to ethereal oil to achieve desired flow rates and filtering reactions. Those of ordinary skill in the art will appreciate that the ratio of oil and water mixture is determined based on parameters such as humidity, temperature, evaporation rate, scent of oil, rate of exhaust flow, and type of filter sticks.

[0045] While the invention has been described with reference to the structures and methods disclosed, it is not confined to the details set forth but is intended to cover such modifications or changes as may fall within the scope of the following claims.

Claims

1. Apparatus for wet filtering of machine exhaust (120) comprising:

   a filtering section (4) which is arranged between base plates (67, 69);
   filter sticks (50) being arranged in said filtering section (4);
   said filter sticks (50) are constituted of foam rubber rods; and
   said filter sticks (50) conducting oil (5) from openings (30) of said base plate (69) to openings (30) of said base plate (67) wherein gravity causes the oil (5) flowing downwards along said filter sticks.

2. Apparatus according to claim 1, **characterized by** an upper and a lower oil container (10) wherein the upper container (10) is provided for delivering of oil (5) and the lower container (10) is provided for receiving oil (5).

3. Apparatus according to claim 2, **characterized in that** said container (10) comprises an oil pad (15).

4. Apparatus according to anyone of the claims 1 to 3, **characterized in that** said filter sticks (50) staggered.

5. Apparatus according to anyone of the claims 1 to 4, **characterized in that** a distance between adjacent filter sticks (50) is no greater than 2 mm.

6. Apparatus according to anyone of the claims 1 to 5, **characterized in that** said filter sticks (50) are strengthened internally by a perforated plastic surface.

7. Apparatus according to anyone of the claims 1 to 6, **characterized in that** light channels (101, 102) are along the respective length of said base plates (67, 69).

8. Apparatus according to anyone of the claims 2 to 7, **characterized in that** said upper container (10) and said lower container (10) are interchangeable.

9. Apparatus according to anyone of the claims 2 to 8, **characterized in that** said upper container (10) comprises a foam pad (15).

10. Apparatus according to anyone of the claims 1 to 9, **characterized by** a housing (3) including at least one auxiliary airflow opening (16).

11. Method for wet filtering of machine exhaust, the method comprising the steps of:

    flowing of machine exhaust (120) through a filtering section (4) provided with filter sticks (50) constituted of foam rubber rods being arranged between base plates (67, 69);
    oil (5) flowing downward along said filter sticks (50), said flowing (90) being caused by gravity;
    preventing a rapid flow of said oil (5) by the foam rubber rods of said filter sticks (50);
    said machine exhaust (120) contacting said oil (5) along said filter sticks (50) wherein ozone particulates and other pollutants are removed from said machine exhaust (120).

12. Method according to claim 11, **characterized by** delivering said oil (5) from an upper oil container (10) to said filter sticks (50).

13. Method according to anyone of the claims 11 or 12, **characterized by** receiving said oil (5) from said filter sticks (50) by a lower oil container (10).

14. Method according to anyone of the claims 11 to 13, **characterized by** use of an oil (5) comprising a scented ethereal oil.

15. Method according to anyone of the claims 11 to 14, **characterized by** preventing from said oil (5) being contained in said container (10) flowing out too quickly by foam rubber pad (15) arranged at the interior side of said container (10).

16. Method according to anyone of the claims 11 to 15, **characterized by** use of exhaust (120) of an office machine as machine exhaust (120).

17. Method according to anyone of the claims 11 to 16, **characterized in that** said office machine is selected from a group consisting of a printer, a photocopier and a facsimile machine.

Patentansprüche

1. Vorrichtung für die Nassfiltration von Maschinenabgasen (120), mit:

einem Filtrationsabschnitt (4), der zwischen Grundplatten (67, 69) angeordnet ist,
Filterstäbchen (50), die in dem Filtrationsabschnitt (4) angeordnet sind,

wobei die Filterstäbchen (50) aus Schaumgummistäben gebildet sind und
die Filterstäbchen (50) Öl (5) von Öffnungen (30) der Grundplatte (69) zu Öffnungen (30) der Grundplatte leiten (67), wobei die Schwerkraft das Abwärtsströmen des Öls (5) entlang der Filterstäbchen (50) bewirkt.

2. Vorrichtung nach Anspruch 1, **gekennzeichnet durch** einen oberen und unteren Ölbehälter (10), wobei der obere Behälter (10) zur Abgabe von Öl (5) vorgesehen ist und der untere Behälter (10) zur Aufnahme von Öl (5) vorgesehen ist.

3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** der Behälter (10) einen Ölpuffer (15) aufweist.

4. Vorrichtung nach Anspruch 1 bis 3, **dadurch gekennzeichnet, dass** die Filterstäbchen (50) versetzt angeordnet sind.

5. Vorrichtung nach Anspruch 1 bis 4, **dadurch gekennzeichnet, dass** ein Abstand zwischen benachbarten Filterstäbchen (50) größer als 2 mm ist.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Filterstäbchen (50) innen durch eine perforierte Kunststoffffläche verstärkt sind.

7. Vorrichtung nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** sich dünne Kanäle (101, 102) entlang der jeweiligen Länge der Grundplatten (67, 69) befinden.

8. Vorrichtung nach einem der Ansprüche 2 bis 7, **dadurch gekennzeichnet, dass** der obere Behälter (10) und untere Behälter (10) untereinander auswechselbar sind.

9. Vorrichtung nach einem der Ansprüche 2 bis 8, **dadurch gekennzeichnet, dass** der obere Behälter (10) einen Ölpuffer (15) umfasst.

10. Vorrichtung nach einem der Ansprüche 1 bis 9, **gekennzeichnet durch** ein Gehäuse (3), das mindestens eine zusätzliche Luftstromöffnung (16) aufweist.

11. Verfahren für die Nassfiltration von Maschinenabgasen, wobei das Verfahren die Schritte umfasst:

Strömen von Maschinenabgasen (120) durch einen Filtrationsabschnitt (4), der mit Filterstäbchen (50) ausgestattet ist, welche mit zwischen Grundplatten (67, 69) angeordneten Schaumgummistäben gebildet werden.
Abwärtsströmen von Öl (5) entlang der Filterstäbchen (50), wobei das Strömen (90) durch die Schwerkraft bewirkt wird;
Unterbinden, dass das Öl (5) zu schnell durch die Schaumgummistäbe der Filterstäbchen (50) strömt;
Kontaktieren von Maschinenabgasen (120) mit dem Öl (5) entlang der Filterstäbchen (50), wobei Ozonpartikel und andere Schadstoffe aus den Maschinenabgasen (120) entfernt werden.

12. Verfahren nach Anspruch 11, **dadurch gekennzeichnet, dass** Öl (5) von einem oberen Ölbehälter (10) an die Filterstäbchen (5) abgegeben wird.

13. Verfahren nach einem der Ansprüche 11 oder 12, **dadurch gekennzeichnet, dass** Öl (5) von den Filterstäbchen (50) durch einen unteren Ölbehälter (10) aufgenommen wird.

14. Verfahren nach einem der Ansprüche 11 bis 13, **dadurch gekennzeichnet, dass** ein Öl (5), das ein parfümiertes ätherisches Öl aufweist, benutzt wird.

15. Verfahren nach einem der Ansprüche 11 bis 14, **dadurch gekennzeichnet, dass** unterbunden wird, dass das Öl (5), das im Behälter (10) enthalten ist, zu schnell aus dem Schaumgummipuffer (15), der an der Innenseite des Behälters (10) angeordnet ist, strömt.

16. Verfahren nach einem der Ansprüche 11 bis 15, **dadurch gekennzeichnet, dass** Abgase (120) von einer Büromaschine als Maschinenabgase (120) gefiltert werden.

17. Verfahren nach einem der Ansprüche 11 bis 16, **dadurch gekennzeichnet, dass** die Büromaschine aus einer Gruppe, die aus einem Drucker, einem Kopiergerät und einer Telefaxmaschine besteht, ausgewählt wird.

Revendications

1. Dispositif de filtrage humide d'un échappement de machine (120) comprenant:

une section de filtration (4) qui est agencée entre des plaques de base (67, 69);
des sticks de filtre (50) agencés dans ladite section de filtration (4);
lesdits sticks de filtre (50) sont constitués de tiges en caoutchouc mousse; et
lesdits sticks de filtre (50) conduisent l'huile (5) des ouvertures (30) de ladite plaque de base (69) aux ouvertures (30) de ladite plaque de base (67), où la gravité amène l'huile (5) à s'écouler vers le bas le long desdits sticks de filtre.

2. Appareil selon la revendication 1, **caractérisé par** un récipient d'huile supérieur et inférieur (10), où le récipient supérieur (10) est prévu pour distribuer l'huile (5) et le récipient inférieur (10) est prévu pour recevoir l'huile (5).

3. Appareil selon la revendication 2, **caractérisé en ce que** ledit récipient (10) comprend un coussinet d'huile (15).

4. Appareil selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** lesdits sticks de filtre (50) sont échelonnés.

5. Appareil selon l'une quelconque des revendications 1 à 4, **caractérisé en ce qu'**une distance entre des sticks de filtre adjacents (50) n'est pas plus grande que 2 mm.

6. Appareil selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** lesdits sticks de filtre (50) sont renforcés intérieurement par une surface plastique perforée.

7. Appareil selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** des canaux de lumière (101, 102) s'étendent sur la longueur respective desdites plaques de base (67,69).

8. Appareil selon l'une quelconque des revendications 2 à 7, **caractérisé en ce que** ledit récipient supérieur (10) et ledit récipient inférieur (10) sont interchangeables.

9. Appareil selon l'une quelconque des revendications 2 à 8, **caractérisé en ce que** ledit récipient supérieur (10) comprend un coussinet mousse (15).

10. Appareil selon l'une quelconque des revendications 1 à 9, **caractérisé par** un boîtier (3) comprenant au moins une ouverture d'écoulement d'air auxiliaire (16).

11. Procédé de filtrage humide d'un échappement de machine, le procédé comprenant les étapes consistant à:

faire passer un échappement de machine (120) à travers une section de filtration (4) munie de sticks de filtre (50) constitué par des tiges en caoutchouc mousse agencés entre des plaques de base (67, 69);
l'huile (5) s'écoulant vers le bas, le long desdits sticks de filtre (50), ledit écoulement (90) étant provoqué par gravité;
éviter un écoulement rapide de ladite huile (5) par les tiges en caoutchouc mousse desdits sticks de filtre (50);
ledit échappement de machine (120) venant en contact avec ladite huile (5) le long desdits sticks de filtre (50), où des particules d'ozone et autres polluants sont retirés dudit échappement de machine (120).

12. Procédé selon la revendication 11, **caractérisé par** la distribution de ladite huile (5) d'un récipient d'huile supérieur (10) auxdits sticks de filtre (50).

13. Procédé selon l'une quelconque des revendications 11 ou 12, **caractérisé par** la réception de ladite huile (5) desdits sticks de filtre (50) par un récipient d'huile inférieur (10).

14. Procédé selon l'une quelconque des revendications 11 à 13, **caractérisé par** l'utilisation d'une huile (5) comprenant une huile essentielle parfumée.

15. Procédé selon l'une quelconque des revendications 11 à 14, **caractérisé en ce qu'**on évite que ladite huile (5) se trouvant dans ledit récipient (10) s'écoule trop rapidement en agençant le coussinet en caoutchouc mousse (15) au côté intérieur dudit récipient (10).

16. Procédé selon l'une quelconque des revendications 11 à 15, **caractérisé par** l'utilisation d'un échappement (120) d'une machine de bureau comme machine d'échappement (120).

17. Procédé selon l'une quelconque des revendications 11 à 16, **caractérisé en ce que** ladite machine de bureau est sélectionnée d'un groupe constitué d'une imprimante, d'une photocopieuse et d'un télécopieur.

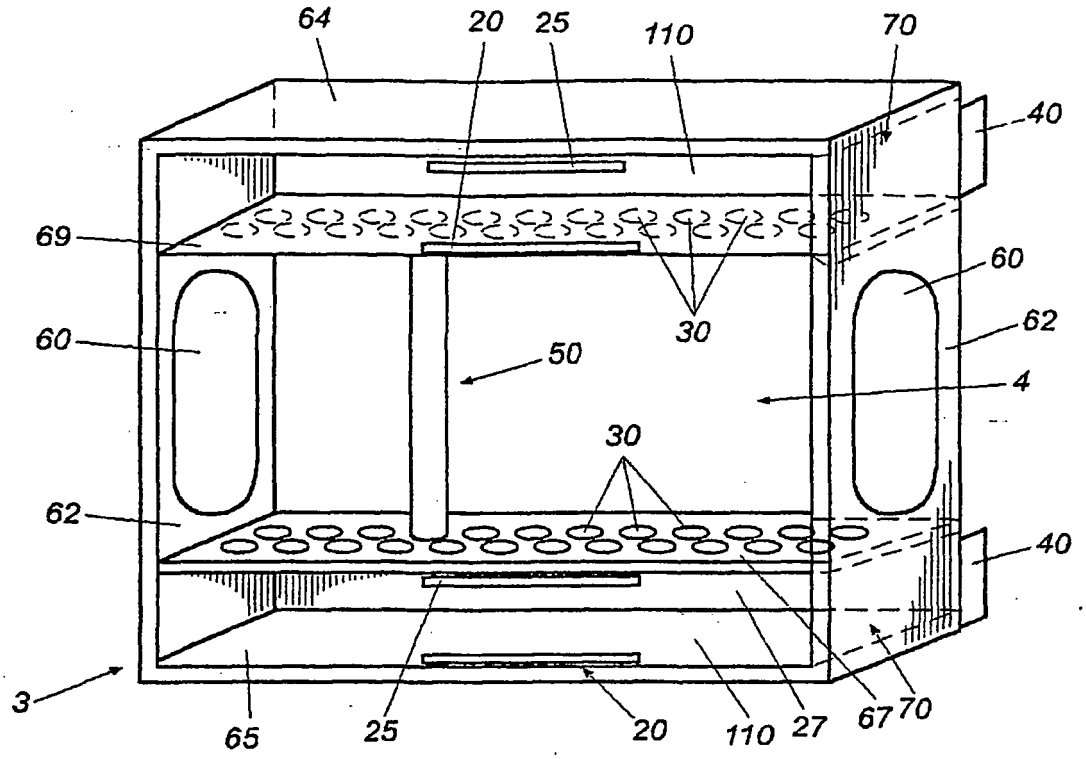


Fig. 1

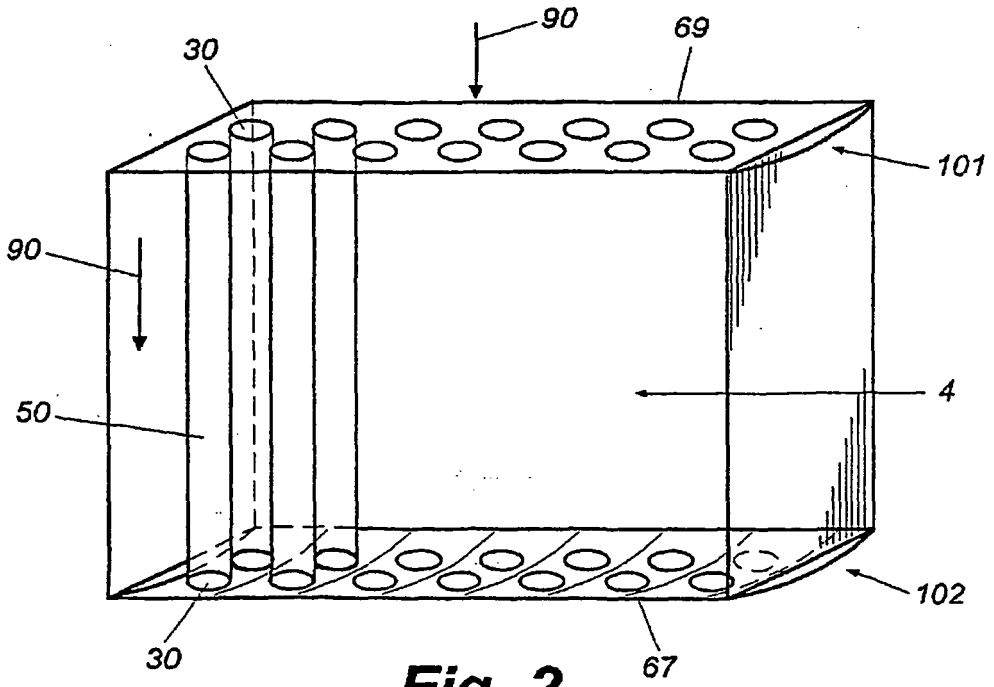


Fig. 2

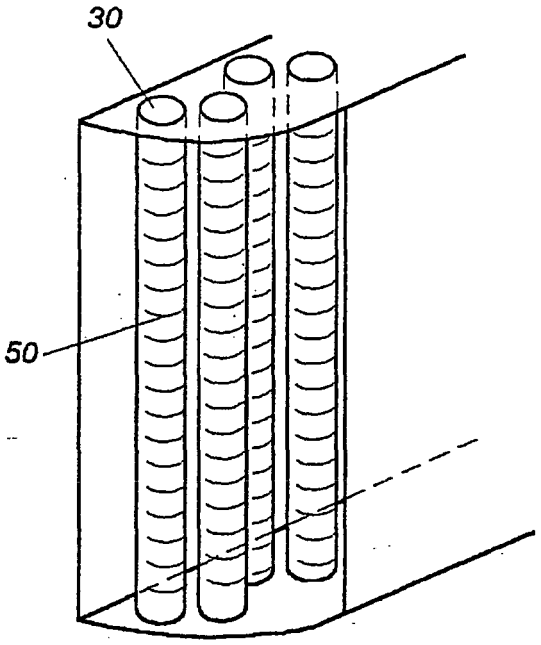


Fig. 3

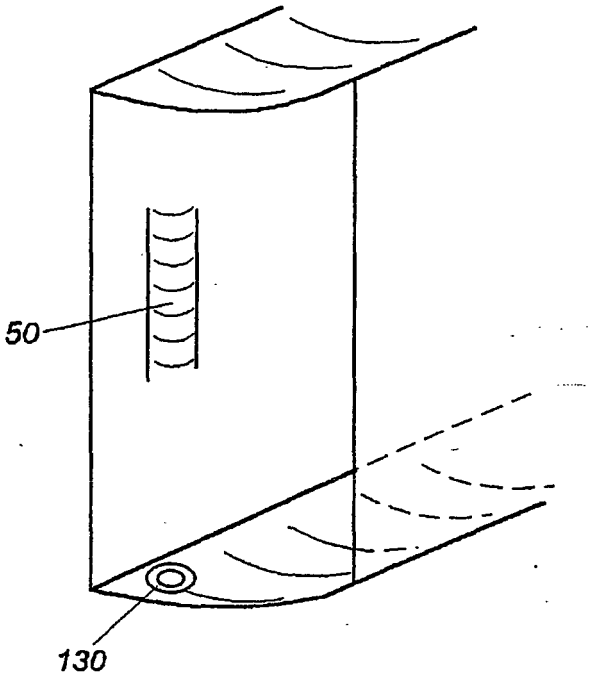


Fig. 4

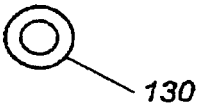


Fig. 5

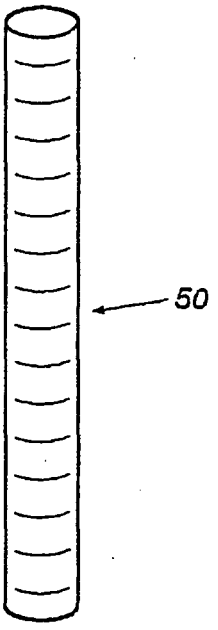


Fig. 6

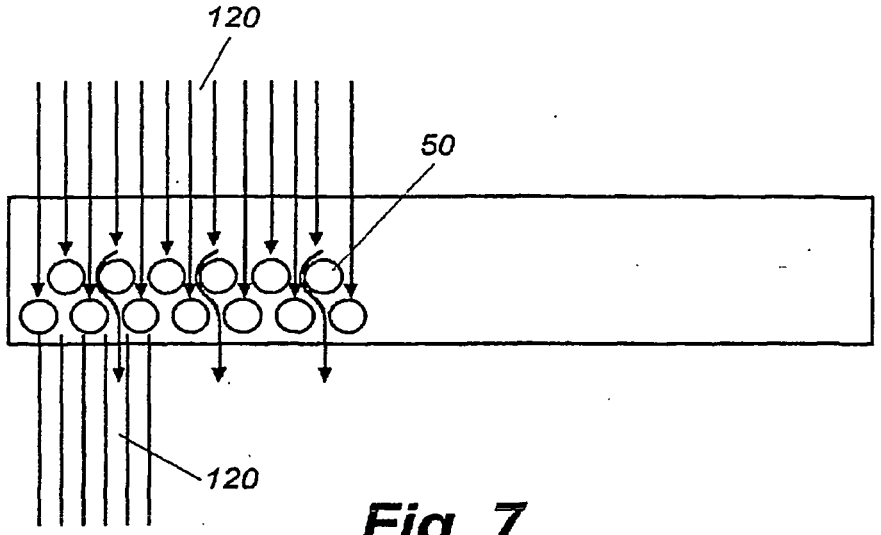


Fig. 7

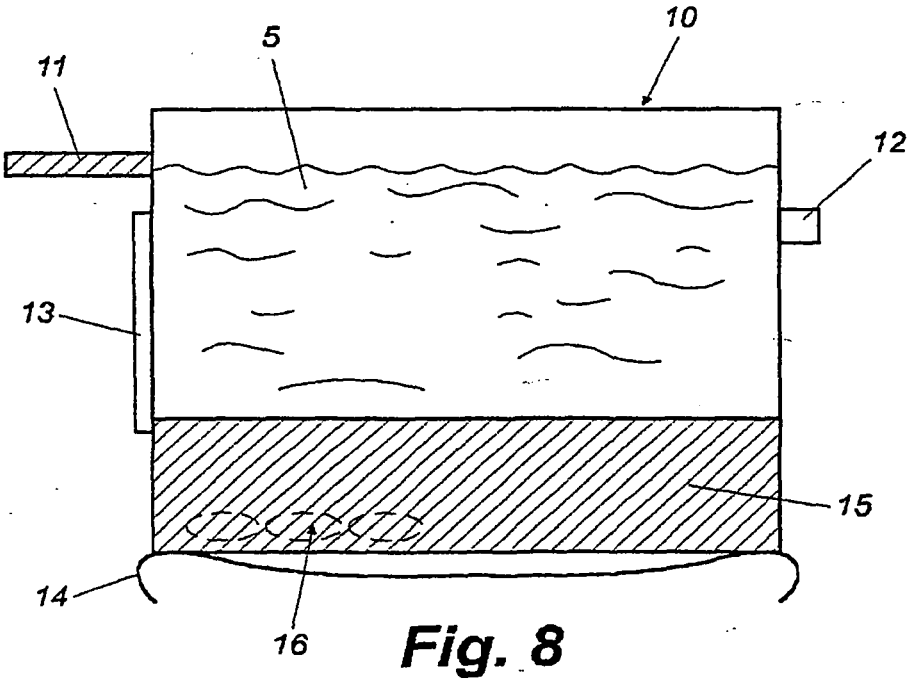


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 328826 C **[0004]**
- US 1989773 A **[0005]**